The City of Burlingame

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January 18, 2002

Ms. Loretta Barsamian
Executive Officer
San Francisco Regional Water
Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attention: Mr. Ken Katen, P.E.

Dear Ms. Barsamian:

Subject: City of Burlingame Comments on the Tentative Order Dated December 21, 2001, Reissuing NPDES Permit No. CA0037788

The City of Burlingame [City] appreciates the opportunity to submit the following comments on the December 21, 2001, Tentative Order [TO] reissuing the City's National Pollutant Discharge Elimination System (NPDES) permit for the Wastewater Treatment Plant [Plant]. Comments are generally numbered sequentially in the same order that issues of concern appear in the TO. The pertinent section headings from the TO are also noted for your convenience.

1. Minor Typographical Deviations Noted by the City

a. In Finding 3, the correct latitude of the NBSU outfall should include "55 seconds N" instead of the currently stated 35 seconds.
b. In Finding 56, the SIP based WQBEL for copper is stated as 26 ug/L daily maximum. Based on the RWQCB staff's effluent limitation calculations shown in Table 6 of the 12/21/01 Fact Sheet, the correct limit is 23 ug/L [rounded down].
c. The phrase "Footnote for Table 5" directly below Table 3 in the Effluent Limits Section on page 28 of the TO should be changed to "Footnote for Table 3".
d. The phrase "Footnotes to Table 7" directly below Table 4 in the Effluent Limits Section on page 31 of the TO should be changed to "Footnotes to Table 4".

2. Discharger Assistance in Developing Lower Detection Limit Analytical Tests
TO reference: Finding 29a.

The first sentence of Finding 29a states that:

> "The Regional Board will request dischargers collectively assist in developing and implementing analytical techniques capable of detecting 303(d)-listed pollutants to at least their respective levels of concern or water quality objectives."

The City does not have the means to conduct time consuming and expensive investigations of new laboratory analytical procedures for 303(d)-listed priority pollutants. In addition, BACWA has not expressed any interest to-date in volunteering to conduct such studies for the RWQCB due to the high expected costs, and the major administrative and technical roadblocks to obtaining EPA approval for such new protocols - if any could be developed.

The City's 13267 letter sampling plan submitted to the RWQCB on 9/27/01 stated in the cover letter [last full paragraph].

> "The City of Burlingame has not chosen the option to pursue the research of methods to achieve lower detection limits since cost of this work could be prohibitive with no certainty of success."

Based on the above background, and consistent with other related findings in the TO, the City requests that development of new analytical techniques for priority pollutants be an <u>option</u>, not a requirement, under the new NPDES permit. As such, the City suggests that the sentence in question in Finding 29a be reworded to state: "The Regional Board may request dischargers, and dischargers will have the option, to collectively assist in developing and implementing analytical techniques ...."

3. Interim Performance Based Limits for Copper
TO reference: Finding 56
Finding 57
Effluent Limitations, Table 4

The SIP-based final WQBELs calculated by the RWQCB staff of 13 ug/L monthly average and 23 ug/L daily maximum [see Table 6 of Fact Sheet] are technically unattainable by the City's Plant based on a maximum effluent concentration in the January 1998 – July 2001 timeframe of 17 ug/L. As part of its 12/7/01 Feasibility Study, the City calculated an interim performance based limit [IPBL] for total recoverable copper of 27.6 ug/L based on the 99.87th percentile as allowed by current RWQCB permitting procedures. However, TO Findings 56 and 57, as well as Table 4 in the Effluent Limitations section on page 31 of the TO, cite an IPBL for copper of <u>25 ug/L</u>.

The City's consultant [Larry Walker Associates, LWA] has reviewed the Cu IPBL calculations contained in the 12/7/01 Feasibility Study [LWA memo dated 11/26/01] as well as the RWQCB staff's calculation of 25 ug/L. LWA has modified its 11/26/01 IPBL calculations to correct missing effluent concentration data points resulting in a revised recommended Cu IPBL of 28.2 ug/L. The City does not accept the RWQCB's 25 ug/L IPBL for copper because it is apparently based on a reduced Cu effluent concentration data set where all non-detects were dropped out.

The City is enclosing LWA's updated IBPL analysis memo dated 1/16/02 to support an IPBL for copper in the new permit of 28 ug/L.

4. Whole Effluent Chronic Toxicity Testing Requirements

TO reference: Finding 85
Provisions – Section E
Part B of Self-Monitoring Program

The City requests that the chronic toxicity testing requirements in the TO be modified to be consistent with the recently adopted permit for the City of Millbrae Water Pollution Control Plant [Millbrae], another member of NBSU. Certain stipulations in the Millbrae permit relating to chronic toxicity were modified at the 11/28/01 RWQCB Hearing as a Supplemental Agenda Item [#18]. The chronic toxicity-related changes to the Millbrae permit, which should also be included in the City of Burlingame permit, are itemized below:

Finding 85b. in the 12/21/01 Burlingame TO should be replaced in total with the following language from Finding 85 in the adopted Millbrae permit:

> "The Discharger conducted a joint study on chronic toxicity with other NBSU members in the early 1990s. That study is no longer valid because one of the discharge contributors to NBSU has ceased operations and no longer discharges. Therefore, this permit requires the Discharger to conduct a new study to quantify the chronic toxicity in its discharge. The Regional Board encourages the Discharger and other NBSU members to cooperatively conduct this study so as to maximize efficiency."

In Section E of the Burlingame permit, add the following new Provision under Whole Effluent Toxicity Requirements [which starts on page 40 of the TO], and renumber the subsequent Provisions as needed:

xx. Screening Plan For Chronic Toxicity

The Discharger shall conduct screening phase compliance monitoring as described in Attachment A of the attached Self Monitoring Program. The Discharger shall submit, in writing, a proposed Screening Phase Study Plan acceptable to the Executive Officer by **September 30, 2002.** The Screening Phase Study Plan shall include an implementation schedule, and shall be implemented upon approval by the Executive Officer. Upon completion of the screening phase study, the Discharger shall submit a report acceptable to the Executive Officer which shall identify the most sensitive species, ongoing monitoring frequency, and am implementation schedule for ongoing monitoring.

Replace the "Frequency" subsection of Footnote 8 to Table 1 in Part B of the Self-Monitoring Program with the following:

Frequency:

i. Routine Monitoring: To be determined based on results of initial chronic toxicity screening. If the discharge demonstrates chronic toxicity, routine monitoring will be required. However, if the discharge demonstrates no chronic toxicity in excess of the triggers specified in the "Conditions for Accelerated Monitoring" subsection below, the

monitoring frequency will be twice during the next five years, once during wet weather, and once during dry weather.

ii. Accelerated Monitoring: Quarterly, or as otherwise specified by the Executive Officer.

5. Clarification of Applicability of Total Chlorine Residual Effluent Limitation
TO reference: Effluent Limitations, Section B1., Table 3, Item v.

Item v. in Table 3 of Effluent Limitation Section B1 specifies an effluent limitation at Sampling Station E-001 [at point of discharge by Burlingame to NBSU force main] for total chlorine residual of 0.0, instantaneous maximum. Although Footnote A to Table 3 states that compliance "may" be demonstrated at the NBSU outfall [E-002], the current configuration of the City's facilities does not provide the option of dechlorinating all effluent at the Plant.

The City requests that the last sentence in Footnote A be removed, and that the paragraph above Table 3 be replaced in total with the following new paragraph:

1. The following effluent limitations apply to effluent discharged to the NBSU joint discharge system and thence to Lower San Francisco Bay through the discharge outfall (Sampling Station E-001 as defined in the Self-Monitoring Program), with the exception of the Total Chlorine Residual limitation which applies only at the NBSU common outfall [Sampling Station E-002]:

6. Clarification of Compliance Determination for Priority Pollutant Effluent Limitations
TO reference: Footnote 1b. to Table 4 in the Effluent Limitations Section

To be consistent with the compliance determination provisions of the SIP (Section 2.4.5), the following sentence should be added to Footnote 1b to Table 4 in the Effluent Limitations Section on page 31 of the TO:

"The Discharger is in violation of the limit if the discharge concentration exceeds the effluent limitation and the reported minimum level (ML) for the analysis."

In addition, Footnote 1 to Table 4 should be extended to the mercury "Notes" column.

Similar language confirming this SIP policy is included in the comparable table for other recently adopted permits in the Bay Area such as the West County Agency permit adopted on 11/28/01.

7. Interim Effluent Limitations Period for Copper
TO reference: Table 4 in the Effluent Limitations Section [TO page 31]
Finding 35

Both Table 4 and Finding 35 in the TO note that the compliance schedule [period during which interim performance based effluent limitations will be in effect] for copper for the City is 5 years from the adoption of the permit. However, copper is a 303(d)-listed constituent for which a TMDL will be required, and for which final effluent limits for the City's Plant can be expected to be based on a TMDL Waste Load Allocation [see Finding 28]. The RWQCB is currently planning to complete TMDLs for most 303(d) constituents, including copper, by 2010 [see Finding 27].

The City requests that the new permit clarify that the 5-year compliance schedule for copper may need to be extended to accommodate the adoption schedule for a TMDL. The City notes that Section 2.1 of the SIP allows up to 15 years from the effective date of the SIP to adopt a TMDL and WLAs, with an additional 5 years after TMDL adoption to comply with the associated final effluent limits.

The City suggests that an appropriate way to clarify the copper compliance schedule would be to remove the linkage to copper of existing Footnote 6 for Table 4, and then add a new Footnote 7 to Table 4 linked only to copper. The City suggests that new Footnote 7 state:

> 7. This interim limit shall remain in effect for five years from the date of adoption of this Permit, or until the Board amends the limit based on site specific objectives or the Waste Load Allocation in the TMDL.

The City notes that this same clarification of interim copper limits has been placed in other Bay Area permits, such as the recently adopted West County Agency permit [11/28/01], the City of Millbrae permit [11/28/01], and the SFO permit [11/28/01].

8. RWQCB Permitting Procedures for Bioaccumulative Constituents

TO reference: Finding 26
Finding 31
Finding 48
Finding 60
Finding 62
Finding 81
Effluent Limitations Table 4.
Effluent Limitations B.7.

The TO imposes performance-based mass limits for mercury and denies for bioaccumulative constituents NBSU's approved deep-water outfall dilution credit of 10:1 . Performance-based mass limits or disallowance of the dilution credit effects, or may eventually effect, the final effluent limits in the City's case for mercury, dieldrin, and 4,4-DDE [considers only bioaccumulative constituents currently with RP]. Consistent with other POTWs in the Bay Area, the City is opposed to performance-based mass limits and denial of dilution credits for bioaccumulative constituents on the bases that:

a. The RWQCB has used narrative Basin Plan toxicity objectives inappropriately to set numeric effluent limits for bioaccumulative constituents.

b. Performance-based mass limits, due to their retrospective basis, could limit population growth and economic development in the sewer service area inappropriately.

c. Performance-based mass limits are redundant since the permitted constituent concentration and the RWQCB-approved plant design flow already clearly define an enforceable mass limit.

d. Performance-based mass limits for mercury are likely to be ineffective in providing any measurable improvement in future mercury concentrations in the Bay since POTWs contribute only approximately 1% of the loadings.

e. The RWQCB has denied dilution credits based solely on the fact that a pollutant is classified as bioaccumulative whereas the SIP at Section 1.4.2.2.B requires that the RWQCB also consider level of flushing in the receiving water which, in the case of the NBSU outfall, is a dilution of at least 10:1 under normal conditions [see TO Finding 3].

f. The RWQCB based its decision to deny dilution credits on BPJ, however, the RWQCB failed to use its own applicable factors which define BPJ as stated in Section 4 of the Basin Plan. Examples of applicable BPJ factors not addressed by the RWQCB include achievability by available technology or control strategies, and economic and social costs and benefits.

9. Sampling Frequency for Effluent BOD Concentration

TO reference: Table 1 in Section II of Part B of the Self-Monitoring Program
Section V-6 of the Fact Sheet

Table 1 in Section II of the Self-Monitoring Program specifies a frequency for monitoring BOD of 3/W for E-001 [Burlingame Plant effluent]. This is the same frequency specified by the City's existing NPDES permit [Order 95-208] as well as for the treatment plants of other members of NBSU in recently adopted permits. [1]

However, Section V-6 of the Fact Sheet [page 17] notes that the BOD monitoring frequency for Burlingame has been set at five-times per week. The City has consistently complied with its BOD effluent limits and, considering all of the other costs associated with new sampling requirements, objects to an increase in sampling frequency. The City requests that the RWQCB confirm that the BOD sampling frequency of 3/W stated in the TO Self-Monitoring Program governs, and that the Fact Sheet indication of a 5/W frequency is an error.

10. Inapplicable Footnote Segment in Section II of Part B of the Self-Monitoring Program

TO reference: Table 1 in Section II of Part B of the Self-Monitoring Program

The last sentence in Footnote 13 to Table 1 in Section II of Part B of the TO Self-Monitoring Program ["The discharger shall report the analytical result for each of the seven PCB congeners, as specified in the CTR."] appears to apply to Table 2 which does not list PCBs. The City requests that this portion of Footnote 13 be removed from the TO.

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[1] The Millbrae and SFO permits adopted by the RWQCB on 11/28/01 both stipulate BOD sampling frequencies of 3/W. Furthermore, the RWQCB's response to comments for the Millbrae permit hearing on 11/28/01 at Item I.F.4-b [page 9] states, regarding frequency of effluent BOD tests: " *In Regional Board staff's best professional judgment, three times a week is the minimum sampling frequency required for fully compliant municipal wastewater treatment plants. Also, retaining CBOD monitoring frequency at three times per week is consistent with self monitoring requirements for other, similar dischargers, including recent and upcoming permits for other North Bayside System Unit (NBSU) members. Millbrae is a member of NBSU.*"

11. Storm Water Monitoring Requirements

TO reference: Section IIIc. of Part B of the Self-Monitoring Program

Section IIIc. of Part B of the TO's Self-Monitoring Program specifies monitoring requirements for storm water runoff from the Plant site. The City has agreed, at the suggestion of the RWQCB staff, to obtain a separate storm water permit for the Plant [under the statewide general permit] as explained in Finding 8a. of the TO. The City would like to consolidate all storm water monitoring efforts under the umbrella of the statewide storm water permit and, therefore, requests that the separate set of storm water monitoring requirements contained in Section IIIc. of Part B of the TO Self-Monitoring Program be removed.

12. Submittal Deadline for Monthly Self-Monitoring Reports

TO reference: Section IV.C of Part B of the Self-Monitoring Program

The first paragraph of Section IV.C [Monthly Self-Monitoring Report (SMR)] of the TO requires that the monthly SMRs be submitted to the RWQCB no later than the last day of the following month. The City requests that the deadline be established as "no later than 45 days after the end of the reporting month" as is typical for Bay Area NPDES permits including the Millbrae and West County Agency permits adopted by the Board on 11/28/01. The additional time is necessary to ensure that all analytical results for contract laboratories can be included in the applicable SMR.

If you have any questions regarding these comments, please contact me at (650) 342-3727 or TociWE@usfilter.com.

Sincerely,

William E. Toci
Plant Manager
US Filter Operating Services, Inc.

Enclosure: 1/16/02 LWA Calculations for copper IPBL

Memorandum

LARRY WALKER ASSOCIATES

DATE: January 16, 2002

TO: Gil Wheeler

SUBJECT: Burlingame Copper IPBL Follow-up

CLAUS SUVERKROPP

509 4th Street
Davis, CA 95616
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Internal Memorandum—Estimated IPBLs for Copper for Burlingame Permit Renewal

This memorandum presents the results of Larry Walker Associates [LWA] analyses to estimate an Interim Performance-Based Limit (IPBL) for copper for Burlingame's NPDES permit renewal. The results of the analyses are summarized below. This memo supercedes the initial analysis contained in LWA's 11/26/01 memo.

Data Set

Copper data for the Burlingame wastewater treatment facility consisted of effluent quality results for 44 monthly sample events, collected from January 1998 to July 2001. There were 39 detected values in the data set (88.6% of the total), including one low outlier value reported at 0.1 µg/L. The maximum detected value was 17 µg/L (sampled in August 1997). The remainder of the data set was comprised of data below detection limits of 5 µg/L and 5.3 µg/L.

Calculation Methods

Interim Performance Based Limits (IPBLs) were calculated from these data using methods consistent with the Regional Board's recommended methodology. The distribution of the data was evaluated using normal probability plots and regression statistics. Because some of the data were below detection, summary statistics and interim permit limits were calculated using the method of Helsel and Cohn (1988) which appears to be consistent in concept with the Regional Board's recommended "log-Probit method" for estimating IPBLs from data sets with data below detection. This method was used to estimate values three standard deviations above the mean of the untransformed and Ln-transformed data (equivalent to the 99.87th percentile), as specified in the Regional Board's method. The value estimated using the untransformed data is equivalent to the IPBL with no further calculations. The value based on the Ln-transformed data is back-transformed (exponentiated) to the original concentration units to provide the IPBL. These calculations are performed for the complete data set including, and then excluding, the single low outlier value. The results of these methods are also compared to an IPBL calculated by the Regional Board using a data set excluding the low outlier and all data below detection.

Results and Conclusion

The results of the analysis of Burlingame's 1998-2001 copper data are summarized in Table 1 below.

Initial evaluation of the data set including the low outlier of 0.1 µg/L suggests that a normal distribution describes the data better than a log-normal distribution (R^2 = 0.97 and 0.72, respectively; see attached figures). There are several reasons to be suspicious of this outcome, however. The reported copper concentration of 0.1 µg/L is a very unlikely result, based on the fact that this concentration is $1/30^{th}$ of the next lowest value and is also much lower than copper concentrations in the drinking water supply. Although quality assurance data are not available for more in depth analysis, it is more likely that this result was incorrectly reported or that the result is for an incorrectly labeled blank sample. Additionally, effluent quality data typically conform better to a lognormal distribution because the distribution of concentrations is "left-bounded", i.e. concentrations can not be less than zero. In this case, an assumption of a normal distribution results in an IPBL of 19.8 µg/L, very close to the maximum observed concentration in Burlingame's effluent (17 µg/L), and also predicts that approximately 2% of Burlingame's effluent copper concentrations are less than zero. Excluding the low outlier results in no significant change in the fit for the normal distribution and a greatly improved fit for the log-normal distribution, with R^2 values that are virtually identical for the two distributions (R^2 = 0.97 vs. R^2 = 0.96, respectively). Overall, it was concluded that a log-normal distribution is a more appropriate model for Burlingame's copper data than a normal distribution.

Based on this evaluation of the data and distributions, it is concluded that the copper IPBL should be based on a log-normal distribution, with the low outlier excluded. Calculation of the IPBL based on a log-normal distribution provides an interim Cu limit of 28.2 µg/L. This estimated IPBL is significantly lower than the Burlingame's previous permit limit (37 µg/L), but should continue to allow Burlingame to comply with copper effluent limitations. Because the estimated IPBL based on the 1998-2001 copper data is lower than Burlingame's previous NPDES limit, it is expected that the newly estimated IPBL would supercede the limit from the previous permit.

Additional calculations supporting these results are provided in Table 2.

The Regional Board also independently calculated an IPBL of 25 µg/L based on a log-normal distribution of the same 1998–2001 effluent data (with the low outlier excluded). However, the calculation used by the Regional Board excluded all of the data below detection, on the basis that there were sufficient detected data to characterize the distribution without using the recommended log-probit method (e-mail comm. to LWA, from Regional Board, 1/15/02). Although, no specific thresholds for adequate numbers (or percent) of detected data were cited, excluding data below detection—at any percentage of the data—is an inappropriate method for calculating IPBLs, as well as being inconsistent with Regional Board's recommended method. Excluding data below detection from the analysis reduces the variability and standard deviation of the data set and therefore results in a systematic low bias in the estimated IPBL, and consequently a systematic increase in the probability of effluent limit violations. It also distorts the distribution of the data, making evaluation of normality difficult. While the magnitude of the bias may not be great in this particular case, the precedent set by this method should be opposed because the systematic bias increases in proportion to the percentage of censored data (demonstrated using Burlingame's data in Figure 2). In Burlingame's case, the resulting Cu IPBL calculated by the Regional Board of 24.4 ug/L is

approximately 11% lower [more stringent] than an IPBL correctly calculated using the log-probit method, and is consequently expected to result in a higher probability of violating the IPBL.

References

Helsel, D., and T. Cohn. 1988. Estimation of descriptive statistics for multiply-censored water quality data. Water Resources Research 24: 1997-2004.

Table 1. Estimated Interim Performance Based Limits for Copper
IPBLs calculated Using the Method of Helsel and Cohn (1988) for estimating distribution parameters for censored data with multiple detection limits.

Cu Value (µg/L)	Basis for Cu limit calculation	Comment
20.0	mean + 3*SD of untransformed data (1998-2001, complete data set, including outlier of 0.1 µg/L)	• Normal distribution is *atypical* for effluent quality data, and predicts that ~1.5% of data are below zero • Estimated IPBL is very close to maximum observed effluent quality concentration (17 µg/L) • Inclusion of low outlier slightly increases variability of effluent quality data, but doesn't significantly affect IPBL
53.4	exp(mean + 3*SD) of Ln(y), (1998-2001, complete data set, including outlier of 0.1 µg/L)	• Log-normal distribution is *typical* for effluent quality data, and predicts no data below zero • Estimated IPBL is less than 2x maximum observed effluent quality concentration (17 µg/L) • Low outlier increases variability of effluent quality data, resulting in high estimated IPBL
18.5	mean + 3*SD of untransformed data (1998-2001, low outlier excluded)	• Normal distribution is *atypical* for effluent quality data, and predicts that ~0.8% of data are below zero • Exclusion of low outlier slightly degrades normal distribution fit • Estimated IPBL is very close to maximum observed effluent quality concentration (17 µg/L)
24.4	exp(mean + 3*SD) of Ln(y), (1998-2001, low outlier and BDL data excluded, per RWQCB analysis recd. by LWA on 1/15/02)	• Log-normal distribution is *typical* for effluent quality data, and predicts no data below zero • Exclusion of low outlier results in greatly improved log-normal distribution fit that is slightly better than normal distribution fit • Exclusion of data below detection results in systematically low-biased estimate of standard deviation, resulting in inappropriately low IPBL.
28.2	Helsel and Cohn 1988; exp(mean + 3*SD) of Ln(y), (1998-2001, low outlier excluded)	• Log-normal distribution is *typical* for effluent quality data, and predicts no data below zero • Estimated IPBL is less than 2x maximum observed effluent quality concentration (17 µg/L) • Exclusion of low outlier results in greatly improved log-normal distribution fit that is slightly better than normal distribution fit • **Recommended Cu IPBL for Burlingame Treatment Plant**

Table 2. Additional Results and Calculations

Statistic	Including outlier[1]		Excluding outlier[2]		Excluding outlier and BDL data[3]
	Untransformed data	Ln(x)	Untransformed data	Ln(x)	Ln(x)
n	43	NA	42	NA	NA
Percent detected	88.6%	NA	88.4%	NA	NA
n detected	39	NA	38	NA	NA
Minimum Detected Value (µg/L)	0.1	NA	3	NA	NA
Maximum Detected Value (µg/L)	17	NA	17	NA	NA
Minimum Reporting Limit (µg/L)	5	NA	5	NA	NA
Maximum Reporting Limit (µg/L)	5.3	NA	5.3	NA	NA
Mean (µg/L)	8.21	1.919	8.60	2.0775	0.34468
Standard Deviation (µg/L)	3.86	0.6865	3.30	0.4135	2.1593
R^2 for distribution regression fit	0.87	0.97	0.97	0.96	0.97
IPBL basis	$\mu + 3\sigma$	$e^{\wedge}(\mu + 3\sigma)$	$\mu + 3\sigma$	$e^{\wedge}(\mu + 3\sigma)$	$e^{\wedge}(\mu + 3\sigma)$
IPBL[4]	**19.8 µg/L**	**53.4 µg/L**	**18.5 µg/L**	**28.2 µg/L[5]**	**24.4 µg/L**

Table notes:
(1) Includes low outlier of 0.1 µg/L.
(2) Excludes low outlier of 0.1 µg/L.
(3) Excludes low outlier of 0.1 µg/L and all data reported as below detection
(4) Calculated from regression statistics
(5) Recommended Cu IPBL for Burlingame Treatment Plant

Figure 1. Comparison of normal probability plots and estimated IPBLs.

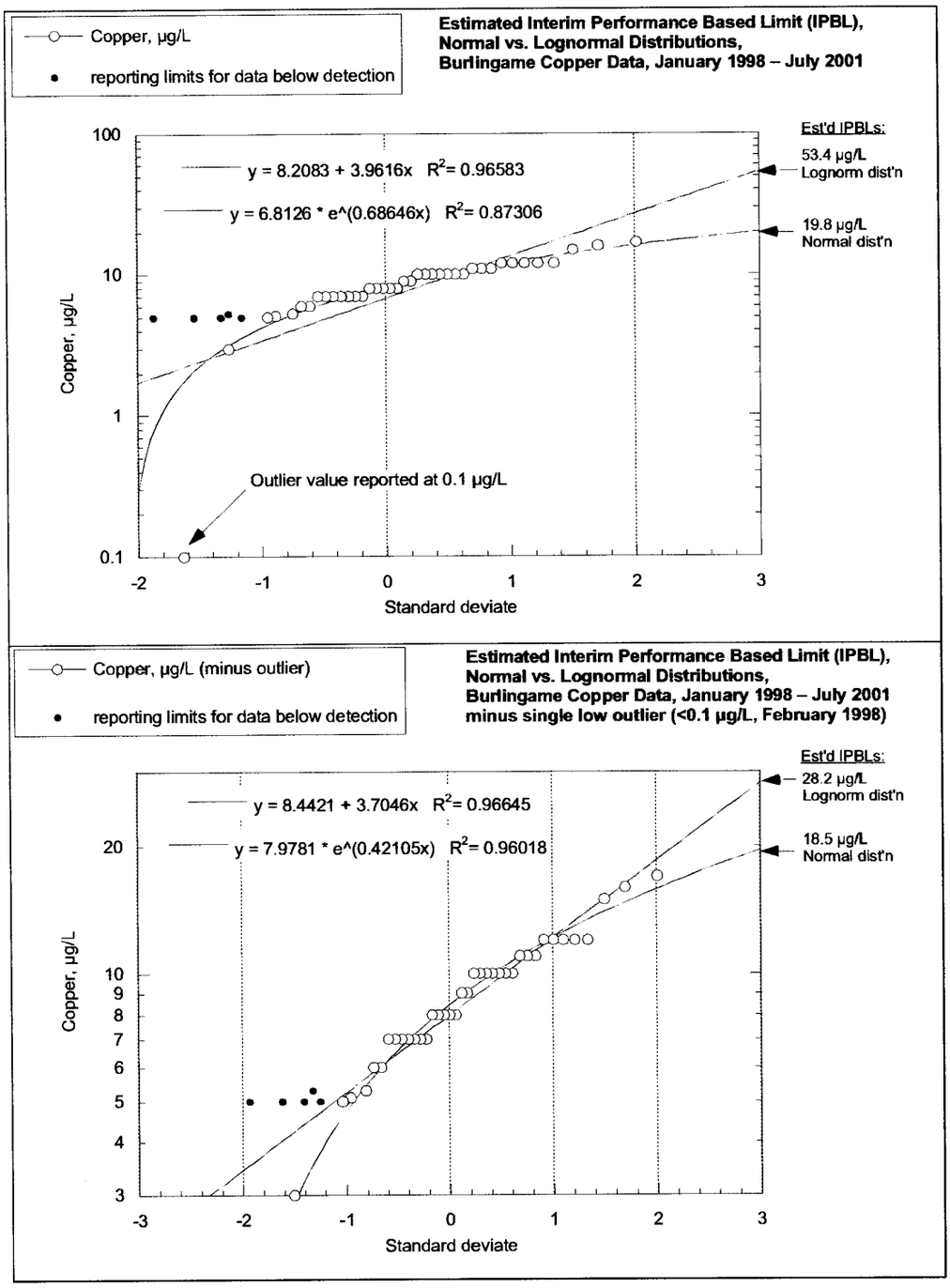

Figure 2. Effect of censoring on distribution parameters and estimated IPBLs.

Plot illustrates effect of increasing levels of censoring on estimated distribution parameters and IPBLs, based on Burlingame's effluent data for copper, 1998 - 2001. As the proportion of censoring increases, the means increase and the standard deviations decrease (see intercept and slope of the regression equations), and the resulting estimated IPBLs decrease. At increased levels of censoring, the distributions of the data are also distorted, as evidenced by the decreasing trend in R-squared values for the regressions.